MULTIMEDIA UNIVERSITY*

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2022/2023 (TERM ID 2210)

BIC1024 – BUSINESS APPLICATIONS DEVELOPMENT

(All sections/Groups)

6 FEBRUARY 2023
2:30 P.M. – 4:30 P.M.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 5 pages with 4 questions only.
2. Attempt **ALL** questions. The distribution of the marks for each question is given.
3. Please write all your answers in the Answer Booklet provided.

QUESTION 1

You're tasked with developing a program that is able to determine a patient's diabetic test results based on the glycated haemoglobin (HbA1c) value. The requirements of the program are:

- Prompt the user to enter patient's name and HbA1c value.
- Determine the diabetic test result based on the HbA1c value:

HbA1c	Diabetic test result
Below 6.0	Normal
6.0 to 6.4	Prediabetic
Above 6.4	Diabetic

- Calculate the patient's plasma glucose: HbA1c * 35.6 – 77.3
- Calculate the patient's white blood glucose: plasma glucose / 1.12
- Display the patient's test results (refer to *sample screenshot).
- Using a do-while loop, prompt the user whether to continue processing another patient's health test result.

```
Enter patient name    : Gan Chin Lay
Enter value for HbA1c : 5.9

::Diabetic test result      : Normal
::Plasma glucose result     : 132.7
::White blood glucose result: 118.5

Continue with another patient (y/n)? y

Enter patient name    : Alex Young
Enter value for HbA1c : 6.3

::Diabetic test result      : Prediabetic
::Plasma glucose result     : 147.0
::White blood glucose result: 131.2

Continue with another patient (y/n)? n
```

*Sample screenshot

(a) Design the program using a problem analysis chart. (5 marks)

(b) Design the program using a flowchart. (10 marks)

(c) Write the complete C program. (10 marks)

(Total: 25 marks)

Continued ...

QUESTION 2

(a) Write a complete C program that calculates the cumulative amount a person will earn from an investment scheme that is expected to yield an annual interest return of 5%. The requirements are:

- Declare global constant variable IR initialized to 0.05 using the preprocessor #define directive.
- Prompt for inputs of investment amount (RM) and investment duration (years).
- Using a for-loop, for each year, calculate the expected return of investment (refer to *sample screenshot). Apply the appropriate formula utilizing the global constant variable IR. (12 marks)

```
Enter investment amount         : RM 3500
Enter investment duraton (years): 5

Year    Amount (RM)
====    ===========
1       3675.00
2       3858.75
3       4051.69
4       4254.27
5       4466.99
```

*Sample screenshot

(b) Below is an incomplete C program. Complete the program by writing only the remaining source codes in order to calculate and display the mean and standard deviation of the integer numbers in array num (refer to *screenshot). Declare the remaining necessary variables. The formula for the standard deviation is:

$$\text{Standard deviation} = \sqrt{\frac{\sum(num[i]-mean)^2}{SIZE}}$$

(13 marks)

```
#include <stdio.h>
#define SIZE 30

main()
{
    int num[SIZE] =
{27,40,14,25,19,82,23,29,31,52,84,83,
57,57,84,37,27,85,25,7,51,40,26,74,20,
75,73,60,24,46};

    /* (b) */
}
```

```
::MEAN  = 45.90
::STDEV = 24.19
```

*Screenshot

(Total: 25 marks)

Continued ...

QUESTION 3

Below is an incomplete C program that will eventually generates the invoice for a customer's purchase (refer to *sample screenshot).

```
#include <stdio.h>
#define SIZE 100
float grandtotal = 0;

/* (a) */
/* (b) */
/* (c) */

main()
{
      int num, i=0, qty[SIZE],itemcode[SIZE];
      float price[SIZE], total[SIZE];

      printf("How many different types of products bought? ");
      scanf("%d", &num);

      getInput(num, itemcode, price, qty);
      calcTotal(num, price, qty, total);
      displayInvoice(num, itemcode, price, qty, total);
}
```

```
How many different types of products bought? 2

Enter item code  : 96106
Enter quantity   : 3
Enter item price : RM 14.5

Enter item code  : 99732
Enter quantity   : 4
Enter item price : RM 15.5


=================================================
Item Code       Qty     Price           Total (RM)
=================================================
96106           3       RM 14.50        RM 43.50
99732           4       RM 15.50        RM 62.00

::GRAND TOTAL   = RM 105.50
```

*Sample screenshot

Continued ...

(a) Declare and define function getInput(....) that prompts the user the inputs for each product's item code, quantity, and price. (9 marks)

(b) Declare and define function calcTotal(....) that calculates the total price of each product, and also sum up the grand total of all products. (6 marks)

(c) Declare and define function displayInvoice(...) to display the invoice details (refer to *sample screenshot). (10 marks)

(Total: 25 marks)

QUESTION 4

Below is an incomplete C program that sorts the integer numbers in array num and display the sorted array as output (refer to *screenshot).

```
include <stdio.h>
#define SIZE 30
void printArray(int num[]);
void printArray(int num[])
{
     int i;
     for(i=0; i < SIZE; i++)
     {
         printf("  %d", num[i]);
     }
     printf("\n\n");
}

/* (b) */
/* (c) */

main()
{
      int num[SIZE] =
{27,40,14,25,19,82,23,29,31,52,84,83,57,57,84,37,27,85,25,7,51,
40,26,74,20,75,73,60,24,46};

      printf("Array before sort: ");
      printArray(num);
      bubblesort(num);
      printf("Array after sort : ");
      printArray(num);
      displayMinMax(num);
}
```

Continued ...

```
Array before sort:   27  40  14  25  19  82  23  29  31  52  84  83  57  57  84  37  27  85
 25  7  51  40  26  74  20  75  73  60  24  46

Array after sort :   7  14  19  20  23  24  25  25  26  27  27  29  31  37  40  40  46  51
52  57  57  60  73  74  75  82  83  84  84  85


::MINIMUM NUMBER : 7
::MAXIMUM NUMBER : 85
```

*Screenshot

(a) Design the program using an interactivity chart. (8 marks)

(b) Declare and define function bubblesort(...) that sorts the integer numbers in array num using the Bubble Sort algorithm. (10 marks)

(c) Declare and define function displayMinMax(...) that determines and display the largest and smallest number in the array num. (7 marks)

(Total: 25 marks)

End of Paper